Remarks

Claims 1-8 and 11-19 were pending.

Claim 3 is canceled.

Claims 1, 2, 4-8 and 11-19 will be pending upon entry of this amendment.

Claim 3 is objected to as being redundant. Claim 3 is canceled.

Claims 1-8 and 11-19 are rejected under 35 USC 103(a) as being unpatentable over Fumitoshi, JP 04-68133 in view of Ton That, U.S. Pat. No. 7,220,484.

Applicants respectfully rebut these rejections.

Applicants note that JP 04-68133 is the application number of Fumitoshi. The publication number is JP 05-271481. This is the same JP reference discussed in the Amendment filed August 8, 2008. An English translation was submitted to the PTO with the prior response. This reference will be referred to as "Fumitoshi".

Fumitoshi is cited as disclosing polyolefin comprising the components:

B) inorganic filler;
C) a specific phenolic antioxidant;
D) a sulphur containing antioxidant;
E) a nitrogen containing antioxidant and
F) a bisphenol A type epoxide.

Fumitoshi also discloses phosphorus containing stabilizers.

Fumitoshi does not disclose nano-scaled fillers.

Ton That is cited as disclosing nano-scaled fillers.

The Examiner states that it would have been obvious to to utilize the nano-scaled filler of Ton That in the teaching of Fumitoshi to arrive at the present invention.

The instant invention is directed to the stabilization of thermoplastic polymers filled with nano-scaled clays. The clays are generally modified with long chain alkyl or dialkyl ammonium ions or amines or in a few cases onium ions such as phosphonium. The ammonium ion/amine additives are usually incorporated into the clay structure by a separate solution intercalation step. See the paragraph bridging pages 1 and 2 of the disclosure.

These organic modified clays have a number of disadvantages when used for the preparation of polyolefin nanocomposites. Ammonium salts are thermally unstable at temperatures used in polyolefin processing or may be otherwise reactive under processing conditions. These instabilities result in poor processing stability, inferior mechanical properties, discoloration, odor formation and reduced long term stability. See the first full paragraph, page 2 of the disclosure.

The inventors have surprisingly found that improved nanocomposites with an increased thermostability, with reduced odor and reduced undesired discoloration, which occurs as a result of the decomposition of the modification agents, can be prepared by the use of a mixture comprising a phenolic antioxidant and/or processing stabilizer and a mono or polyfunctional compound selected from the group of certain epoxides, oxazolines, oxazolones, oxazines and isocyanates (as defined in present claim 1).

The results are surprising; the combinations show a significant improvement when compared to the individual stabilizers (Table 1, page 56). When the epoxide compound is added to the stabilizers (Examples 1e, 1f and 1g), color is improved and heat stability is maintained, compared with the samples containing the stabilizers alone (Examples 1b, 1c and 1d). The total concentration of additives has been kept equal in all cases. These results are surprising and could not have been expected based on the combined disclosures of the cited art.

In order to further point out this unexpected surprising effect, Applicants submit a Rule 132 Declaration by Dr. Rainer Xalter. Three series of experiments have been carried out which are presented in Tables 1-3. Table 1 shows the results of classically filled polymers with a low degree of

filler (5 wt. %), which would be typical for nano-scaled fillers. Stabilization with Irganox B 225 (phenolic antioxidant and phosphite process stabilizer) alone results in an OIT of 9.9 minutes. The addition of 5 wt.-% Cloisite Na+ results in an improvement up to 32.5 minutes. Further addition of Araldit GT 7072 (bisphenol A type epoxide) significantly decreases the value down to 15.4 minutes. In other words, in a classically filled polymer with low degree of filler the addition of the epoxide is detrimental.

Table 2 shows the results of classically filled polymers with a conventional degree of filler (20 wt. %, see Fumitoshi). Stabilization with Irganox B 225 (phenolic antioxidant and phosphite process stabilizer) alone results again in an OIT of 9.9 minutes. The addition of 20 wt. % Cloisite Na+ results in reduction down to 2.7 minutes. Further addition of Araldit GT 7072 (bisphenol A type epoxide) improves the OIT value up to 7.0 minutes, the value of the unfilled system, however, is not reached. In other words, in a classically filled polymer with conventional degree of filler the addition of the epoxide improves the OIT value. However, the stability of the unfilled sample is not reached.

Table 3, Example 3.3 shows the result which is obtained according to the instant invention. Stabilization with Irganox B 225 (phenolic antioxidant and phosphite process stabilizer) alone results in an OIT of 9.9 minutes. Addition of 5 wt % Cloisite 20A (nano-scaled phyllosilicate) reduces the OIT value to 7.5 minutes (compare Table 1 classically filled system with 5 wt. % degree of filling where an improvement has been observed). Further addition of Araldit GT 7072 (bisphenol A type epoxide) improves the OIT value significantly up to 13.0 minutes which is definitely higher than the OIT value of the unfilled sample.

The results show that conclusions drawn from polymers with conventional filler cannot be extended to nanocomposites. The results are unexpected and can not be deduced from the combined disclosure of the cited art.

The Rule 132 Declaration is unsigned. A signed version will be submitted shortly in a supplemental response.

In view of the results of the working Examples and the Xalter Declaration, Applicants submit that the claim rejections are addressed and are overcome.

The Examiner is kindly requested to reconsider and to withdraw the present rejections.

Applicants submit that the present claims are now in condition for allowance and respectfully request that they be found allowable.

Respectfully submitted,

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Attachment: Rule 132 Declaration by Dr. Rainer Xalter (unsigned)